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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/992,578	11/06/2001	Ja-Young Koo	81758	9881

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KRIEGSMAN & KRIEGSMAN
665 FRANKLIN STREET
FRAMINGHAM, MA 01702

EXAMINER

MENON, KRISHNAN S

ART UNIT	PAPER NUMBER
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1723

DATE MAILED: 01/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/992,578

Applicant(s)

KOO ET AL.

Examiner

Krishnan S Menon

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 and 58-67 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-30 and 58-67 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Claims 1-30 and 58-67 are pending.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-8, 21-26, 58-61, 65 and 66 are rejected under 35 U.S.C. 102(e) as being anticipated by Mickols (US 6,280,853 B1).

Claims 1 and 58: Mickols teaches a reverse osmosis membrane comprising a microporous support a polyamide layer on the microporous support (col 3 lines 10-20) and a hydrophilic coating of an crosslinked epoxy compound (col 4 lines 25-46) as in claim 1. Re claim 58, Mickols teaches a microporous membrane with a hydrophilic coating, as above (claim open-ended).

Claims 2 and 59: microporous support is polysulfone, etc. (col 6 line 5)

Claim 3: polyamide layer by interfacial polymerization (col 3 lines 10-28)

Claims 4-6: polyfunctional amine is an aromatic primary amine, and metaphenylene diamine or piperazine (col 3 lines).

Claim 7, 8: polyfunctional acyl halide (col 3 lines 10-28); trimesoyl chloride (col 3 line 55)

Claims 21, 22 and 65: polyfunctional epoxy has exactly two epoxy groups (examples, col 4 lines 27-45); ethylene glycol diglycidyl ether (example);

Claims 23, 24, 66: cross-linking compound has at least three epoxy-reacting groups; such as amine, or carbonyl (claims 13 and 16; col 4 lines 15-59, especially 37-46; col 5 lines 10-62)

Claims 25, 26: three epoxy reactive groups the same – the polyamide layer; or different (col 4 lines 15-59, col 5 lines 10-63)

Claims 60 and 61: microporous support is a microfiltration or ultrafiltration membrane: see col 6 lines 1-15; col 1 lines 16-30.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 9-15, 17-20, 27, 28, 30, 62-64 and 67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mickols (853) in view of Marinaccio et al (US 4,915,839).

Mickols teaches all the limitations of claims 1, 21, 23, 58 and 65. Instant claims add further limitations not taught by Mickols, but taught by Marinaccio, as follows:

Claims 9 and 62: polyfunctional epoxy has at least three epoxy groups: see structures of col 12.

Claim 10: one or more of the compounds listed are taught by Marinaccio (col 14 lines 1-68)

Claims 11 and 63: cross-linked through self polymerization: inherent from Mickols in view of Marinaccio; similar reagents as used by the applicant should produce similar products The express, implicit, and inherent disclosures of a prior art reference may be relied upon in the rejection of claims under 35 U.S.C. 102 or 103. "The inherent teaching of a prior art reference, a question of fact, arises both in the context of anticipation and obviousness." In re Napier, 55 F.3d 610, 613, 34 USPQ2d 1782, 1784 (Fed. Cir. 1995) (affirmed a 35 U.S.C. 103 rejection based in part on inherent disclosure in one of the references). See also In re Grasselli, 713 F.2d 731, 739, 218 USPQ 769, 775 (Fed. Cir. 1983).

Claims 12 and 64: cross-linking with the help of a cross-linking compound – see col 9 line 61 – col 14 line 10)

Claim 13: epoxy reactive groups amino or carboxyl – col 12 line 32- col 13 line 66

Claim 14: at least two epoxy reactive groups are the same – carboxylic, for example – col 13 line 56-62

Claim 15: epoxy reactive groups can be different: amine or carboxyl groups from the polyamide layer (Mickols col 4 lines 55-58) and carboxyl or amine groups as used by Marinaccio (col 12 and 13).

Claim 17: alkane diamine as per the formula – see col 11 line 30; col 12 lines 50-60

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Claims 18 and 27: cross-linking agent as diethylene triamine, etc – col 11 lines 20-30.

Claims 19, 20 and 28: Marinaccio may not be listing the exact carboxylic or sulfonic acids listed as in these claims, but teaches polyfunctional carboxylic or sulfonic acids in col 13 line 55 – col 14 line 11, which would afford anionic (negative charged) membrane, or compounds having zwitter ions in col 14 lines 55-68, as recited in the specification page 19, 4th para 4 and page 20, 1st para, and therefore, equivalent. In this case, the prior art element: (A) performs the identical function specified in the claim in substantially the same way, and produces substantially the same results as the corresponding element disclosed in the specification. *Kemco Sales, Inc. v. Control Papers Co.*, 208 F.3d 1352, 54 USPQ2d 1308 (Fed. Cir. 2000). (B) is not excluded by any explicit definition provided in the specification for an equivalent. A person of ordinary skill in the art would have recognized the interchangeability of the element shown in the prior art for the corresponding element disclosed in the specification. *Caterpillar Inc. v. Deere & Co.*, 224 F.3d 1374, 56 USPQ2d 1305 (Fed. Cir. 2000); *Al-Site Corp. v. VSI Int'l, Inc.*, 174 F.3d 1308, 1316, 50 USPQ2d 1161, 1165 (Fed. Cir. 1999); *Chiuminatta Concrete Concepts, Inc. v. Cardinal Indus. Inc.*, 145 F.3d 1303, 1309, 46 USPQ2d 1752, 1757 (Fed. Cir. 1998); *Lockheed Aircraft Corp. v. United States*, 193 USPQ 449, 461 (Ct. Cl. 1977); *Data Line Corp. v. Micro Technologies, Inc.*, 813 F.2d 1196, 1 USPQ2d 2052 (Fed. Cir. 1987). Also, a prima facie case of obviousness may be made when chemical compounds have very close structural similarities and similar utilities. "An obviousness rejection based on similarity in chemical

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structure and function entails the motivation of one skilled in the art to make a claimed compound, in the expectation that compounds similar in structure will have similar properties.” In re Payne, 606 F.2d 303, 313, 203 USPQ 245, 254 (CCPA 1979). See In re Papesch, 315 F.2d 381, 137 USPQ 43 (CCPA 1963) and In re Dillon, 919 F.2d 688, 16 USPQ2d 1897 (Fed. Cir. 1991) (discussed in MPEP § 2144) for an extensive review of the case law pertaining to obviousness based on close structural similarity of chemical compounds. See also MPEP § 2144.08, paragraph II.A.4.(c). “[I]n considering the disclosure of a reference, it is proper to take into account not only specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom.” In re Preda, 401 F.2d 825, 826, 159 USPQ 342, 344 (CCPA 1968); In re Lamberti, 545 F.2d 747, 750, 192 USPQ 278, 280 (CCPA 1976).

Claims 30 and 67: crosslinking compound having two primary amino groups, etc – see table in col 12 at line 51.

It would be obvious to one of ordinary skill in the art at the time of invention to use the teaching of Marinaccio in the teaching of Mickols for having cationic, anionic or zwitterion membranes because it makes the membrane sanitizable or strilizable, and capable of capturing anionic, cationic and other particles smaller than the effective pore size of the membrane (Marinaccio col 5 line 55 – col 6 line 11).

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2. Claims 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mickols (853) in view of Marinaccio et al (US 4,915,839) as in claim 13 above and further in view of Linder (US 4,778,596).

Mickols in view of Marinaccio does not teach using a polyol as crosslinking compound. Linder teaches coating a semipermeable membrane with a hydrophilic coating comprising an epoxy compound and a polyol such as PVA (col 4 lines 50-68; col 5 lines 1-35; col 7 lines 5-40 and 45-50; col 9 line 43-55; col 10 lines 63-68). It would be obvious to one of ordinary skill in the art at the time of invention to use the teaching of Linder in the teaching of Mickols in view of Marinaccio for making a hydrophilic cross-linked reverse osmosis membrane with improved solvent, pressure and temperature resistance (see abstract).

3. Claims 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mickols (853) in view of Linder (US 4,778,596).

Mickols teaches all the limitations of claim 23. Claim 29 adds further limitation of polyols as cross-linking compounds. Linder teaches coating a semipermeable membrane with a hydrophilic coating comprising an epoxy compound and a polyol such as PVA (col 4 lines 50-68; col 5 lines 1-35; col 7 lines 5-40 and 45-50; col 9 line 43-55; col 10 lines 63-68). It would be obvious to one of ordinary skill in the art at the time of invention to use the teaching of Linder in the teaching of Mickols for making a hydrophilic cross-linked reverse osmosis membrane with improved solvent, pressure and temperature resistance (see abstract).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Krishnan S Menon whose telephone number is 571-272-1143. The examiner can normally be reached on 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda L Walker can be reached on 571-272-1151. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Krishnan Menon
Patent Examiner


W. L. WALKER
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700